External electrical connections are to each block **315** and via substrate **312** to the evaporatively metal-coated QTC layer **314** as a whole. Since the polymer composition used has zero or low conductance in its plane, layers **321** in this sensor can be of different polymers, for sensitivity to different trace constituents in the fluid.

Referring to FIG. **3**(*c*), the sensor is similar to that of FIG. **1**(*a*), but grid **18** (now numbered **22**) is separated from tube **16** and is movable up and down. Grid **22** may comprise electrically conductive material and act as an electrode, but this is not necessary if QTC block **20** carries a conductive coating such as evaporatively applied metal. Above grid **22** is disposed block **24** of permeable swellable polymer as for example random-packed particles, open-cell foam, cloth or honeycomb: such polymer is chosen to be absorptive of, and thus swollen by, a constituent of the fluid to be analysed. Above polymer block **24** is disposed porous ceramic frit **26**, distributing the generated stress over block **24**. This sensor is used in the same general manner as **1**(*a*). However, particular modes of operation are available:

1. block **24** can remove from the fluid a constituent that is of no interest, thus preventing it from masking other constituents that are to be determined by reference to change of electrical resistance of body **20**;
2. block **24** can swell and apply pressure to body **20**, thus decreasing its resistance. This enables the sensor to react to a constituent that is inert to the polymer component of body **20**, and thus broadens the scope of use of the sensor without changing the polymer component of body **20**;
3. if the trace material is present in very low concentration, it may be stored in block **24** over a relatively long time, then expelled by heating (means not shown) over a short time, thus passing a more substantial quantity to body **20** to affect its conductance.

Referring to FIG. **4**(*a*), in a fluid channel indicated generally at **410** is disposed block **412** of fluid-permeable polymer composition consisting of granular QTC nickel/silicone (weight ratio 7:1; volume ratio 0.824:1 of solid nickel within the composition), dispersed in collapsed silicone foam, as described in application PCT/GB/02402). Upstream and downstream of block **412** are placed rigid metal frit electrodes **414**, and these are held in contact with block **412** by adjustable bolts **416**. Block **412** may be electrically non-conductive or weakly conductive ('start-resistive') as installed, then brought to conductance by compression by tightening bolts **416**. Alternatively block **412** may be conductive as installed, for example by more strongly collapsing its foam structure and/or by using initially conductive nickel/silicone of higher nickel content or shrunk during cross-linking: then bolts may be used to increase starting conductance further. Block **412** and electrodes **414** may be supported in an outer sleeve for insertion into flow channel **410**, with O-ring seals mating with the wall of the channel.

The sensor of FIG. **4**(*b*) is similar to that of FIG. **4**(*a*) but can, owing to longitudinal instead of transverse flow, afford a longer residence time of fluid. The gas flow channel is suitably of rectangular cross-section, at least in the region of the sensor. Block **413** can be of the same composition as in FIG. **4**(*a*) and is disposed between non-permeable metal electrodes **415** with compression adjustable by bolts **417**. Alternatively, to fit a cylindrical channel, compression can be adjusted by a worm-driven tubing clip.

A sensor designed to use the principle of FIG. **4**(*b*) is shown in perspective view in FIGS. **4**(*e*) and **4**(*f*) below.

The sensor of FIG. **4**(*c*) affords a relatively short residence time. It is similar to FIG. **2**(*a*) but provides throughflow of fluid. The sensitive element is sheet **430** of foam-supported nickel/silicone QTC granules as in FIG. **4**(*a*), supported by non-conducting fixed substrate **432** and horizontally movable substrate **434**, adjustment of which varies stretch and thus conductance of sheet **430**. At the extremities of sheet **430** are electrodes **436**, clamped into electrical contact with sheet **430** by bolts **438**.

FIG. **4**(*d*) shows a sensor applicable to an outlet pipe **440**. It comprises outer framework **442** having fluid-permeable wall region **444**, supporting cylindrical block **446** formed internally with axial passage sized to fit snugly over the end of pipe **440** and closed at its downstream end at **448**, so that fluid flow is outwardly through region **444**. Pipe **440** may be formed with a perforated downward extension controlling the distribution of fluid into block. Block **446** is made of the same foam-supported polymer composition as in FIG. **4**(*a*). Above block **446** and in electrical contact with it is hollow metal cylinder **450** fitting snugly over pipe **440** and fixed in relation to block **446** within framework **442**. Below block **446** and in electrical contact with its downstream end **448** is metal cylinder **452**, which is movable up and down within framework **442** to adjust the conductance of block **446**.

In FIG. **4**(*e,f*) items **413**, **415** and **417** correspond to those shown in FIG. **4**(*b*). Electrodes **415** are made of stainless steel and their position in relation to QTC block **413** is adjustable by means of bolts **417**. They are removable or replaceable by sliding axially of cylinder **420**. The whole unit is assembled in outer cylinder **420**, suitably made of 'PERSPEX' acrylic polymer, formed with grooves housing O-rings **422** to form a seal when inserted into a cylindrical fluid flow channel.

Referring to FIG. **5**, sketches (a,b) show how devices according to FIGS. **2**(*c*) to **2**(*e*) can be assembled into a multiple analyser. In FIG. **5**(*a*) rigid substrate **263** formed with cones **264** is aligned with QTC sheet **260** and holes **265** of insulating disc **266**,**267**, possibly on a shaft passing through holes **272**. The three items are then pressed together.

FIG. **5**(*b*) show a modifications of FIG. **5**(*a*) in which more scope for stretch adjustment is provided. Now substrate **263** carrying conical former **264** is replaced by perforated plate **274** and the function of formers **264** is provided by height-adjustable pistons **276**. The analyser is assembled in the same way as in FIG. **5**(*a*).

Referring to FIG. **5**(*c*), a miniaturised throughflow sensor **510**, such as described with respect to FIG. **1**, **3**(*c*) or **4**(*c*), is mounted in each of the holes **512** in disc **514**. Disc **514** is rotatable about bearing **516** by powered means (not shown). The fluid inlet **518** of each sensor is fed from a separate source of analyte or from a rotary changeover valve system (not shown). Using such a valve system each sensor can operate in successive phases, for example, sorption, equilibration, desorption/washing.

Referring to FIG. **5**(*d*), a system such as that of **5**(*c*) can be operated with electrical instead of or additional to mechanical stress. In position **520** a high voltage pulse applied to the QTC material in sensor 'A' by way of its electrodes induces conductance. Sensor 'A' is then moved to position **522** at which it is connected to a Wheatstone Bridge circuit. Flow of analyte is started and its effect on conductance is measured. At the end of measurement sensor 'A' is moved to position **524** for subsequent phases such as mentioned above, or possibly for electrical reactivation. When sensor 'A' reaches position **522**, a further sensor 'B' arrives at position **520** and is activated by high voltage pulse and so on.